"Minimizing Proliferation Risk in the Expansion of Nuclear Energy"

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Introduction

International Atomic Energy Agency Director General Mohamed ElBaradei has called dissemination of sensitive fuel cycle technology the potential "Achilles' Heel" of the nuclear nonproliferation regime. Recognizing this, President Bush has proposed the Global Nuclear Energy Partnership, or GNEP, as well as the need to increase our use of nuclear power. Dr. ElBaradei proposed multinational control of the nuclear fuel cycle, and Russian President Putin proposed international fuel cycle centers as other approaches to solving this issue. At the IAEA Special Event in September, delegates considered proposals for assuring nuclear fuel supply. What each of these proposals has in common is the goal of expanding the use of nuclear energy while avoiding its known challenges, including not only proliferation risks but also challenges of safety, security and waste management.

We must ensure that our efforts minimize civil plutonium stockpiles, discourage the spread of enrichment and reprocessing capabilities, improve proliferation resistance, and develop advanced safeguards.

Minimizing Civil Plutonium Stockpiles

The current civil nuclear fuel cycle, as implemented outside the United States, has generated large quantities of separated plutonium that have no immediate economic use. Nearly 250 tons of separated civil plutonium is in storage. If nuclear energy development continues, it will lead to further buildup of this material, which is usable in nuclear weapons.

GNEP continues the longstanding U.S. policy of discouraging the worldwide accumulation of separated plutonium and aims to avoid this risk in part by pursuing spent fuel

recycling processes that do not separate plutonium. The goal under GNEP is to minimize any further buildup and eventually drawdown existing stockpiles of separated plutonium. This policy would apply not only to pure plutonium but also to other material that is nearly equivalent to pure plutonium in terms of its proliferation and security risks.

GNEP would address the buildup of plutonium in spent fuel. Under the proposed reliable fuel assurance mechanism, suppliers would provide both assured access to nuclear fuel at the front end and assured take-back of spent fuel at the back end of the fuel cycle. Although interim storage may have a role to play in facilitating spent fuel take-back in the near term, the ability to sustain such take-back over the long term depends on the ability to recycle that fuel in a way that minimizes the demands of waste management.

Discouraging the Spread of Enrichment and Reprocessing

In his February 2004 speech at the National Defense University, President Bush made several proposals that aim to halt the further spread of enrichment and reprocessing capabilities. Those technologies can be used both for peaceful purposes and to produce material for use in nuclear weapons. President Bush also proposed that leading nuclear suppliers develop a system to provide reliable access at reasonable cost to fuel for civilian reactors, as an incentive for countries to forgo developing enrichment and reprocessing.

It would be economically wasteful if every country that uses nuclear power developed the full range of fuel cycle facilities, including enrichment and reprocessing. We aim to make it an easy decision for countries to rely instead on international markets and mechanisms. The United States has joined five other fuel suppliers in proposing a reliable supply mechanism for low-enriched uranium (LEU) fuel in the event of a commercial supply disruption. To support these efforts, the United States has offered 17.4 metric tons of highly-enriched uranium (HEU) to be down blended and held in reserve in case of a disruption in supply that cannot be met by the commercial market. We have agreements for peaceful nuclear cooperation with nearly 50 countries, which would provide the legal framework for timely supply of nuclear fuel in such cases. For other countries, we are prepared to consider trilateral “Project and Supply” agreements with the country in question and the IAEA. We would support the adoption by the IAEA Board of Governors of a model trilateral agreement, with appropriate conditions, to facilitate a quick response to an emergency supply request.

We encourage others to create similar reserves or other complementary mechanisms. A diversity of supply mechanisms will enhance the credibility of international assurances of reliable fuel supply. For example, we support the proposal by the Nuclear Threat Initiative for a reserve administered by the IAEA, and are working with Russia to develop further our similar proposals for nuclear fuel supply services and international fuel service centers.

Improving Proliferation Resistance

We are also seeking to limit proliferation risks by developing technologies that have inherent proliferation resistance. Such features typically include producing and using materials that are less attractive for weapons and increasing barriers to the diversion of materials and the misuse of facilities.

GNEP also aims to develop small- and medium-sized reactors suitable for deployment in developing countries. Such right-sized reactors will be designed for connection to smaller electrical grids and to minimize the burdens on the reactor operator. Some features, such as sealed reactor cores with long operational cycles – perhaps even lifetime cores – will also minimize opportunities for proliferation and simplify the task of applying IAEA safeguards.

Of course, no nuclear facility or fuel cycle is entirely proliferation proof. Fissionable material can be diverted and nuclear facilities can be misused. Recognizing these inherent risks, we are developing a systematic approach to assessing and comparing proliferation risks across the nuclear fuel cycle. This builds on efforts by the Working Group on Proliferation Resistance and Physical Protection of the Generation IV International Forum, with a broad approach that considers the entire the fuel cycle.

Our objectives are to make such diversion and misuse more difficult, more costly, and more readily observable, and to make the acquisition of sensitive fuel cycle technologies more difficult to justify as part of a peaceful nuclear program. Once the GNEP fuel cycle becomes the norm, it will reduce the credibility of any country's claim that it needs enrichment or reprocessing for peaceful purposes. Rather, the pursuit of those capabilities will face a high hurdle in achieving public and international credibility.

Advanced Safeguards Technologies

We also aim to develop advanced international safeguards, both for the new fuel cycle technologies and facilities planned under GNEP and more broadly. The United States will make its GNEP facilities eligible for IAEA safeguards, and we stand ready to work with the IAEA to develop new technologies and approaches to strengthen IAEA safeguards. The Additional Protocol will be an essential tool for the IAEA, to confirm that countries are not pursuing clandestine enrichment or reprocessing programs.

The expansion of nuclear energy – and the GNEP vision – demand that we reinvigorate our investments in support of international safeguards and rejuvenate both the safeguards technology base and the community of safeguards experts. While radiation detection is a mature technology, in-line instrumentation, advanced modeling, simulation and data analysis techniques, and other technologies and methods continue to evolve and present opportunities to improve both the effectiveness and efficiency of safeguards.

In addition to developing new safeguards techniques and equipment, we are working from the very start to incorporate safeguards considerations into the design of the new facilities planned under GNEP. This is true not only for government-developed facilities, where safeguards experts will participate in the design teams, but also for any facilities that may be procured on a commercial basis.

Conclusion

I am encouraged that we are anticipating and working hard to resolve potential problems before they arise. If we fail to respond comprehensively, we not only put the expansion of nuclear power at risk, but we will fail to realize some of the key cross-cutting benefits I have mentioned. On the other hand, if we address these challenges even as we seek to expand nuclear energy, we will safeguard both energy security and national security for future generations.